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Vibrating Razor Head

**Field of Invention:**

The invention pertains generally to a vibrating razor and, more particularly, to a razor in which the razor head is adapted for use with a mechanically-responsive material. In which said mechanically-responsive material is excited using an electrical signal.

**Background Invention:**

Razors adapted to movably support a blade or a disposable cartridge, commonly referred to as vibrating razors, are well known. Various mechanical arrangements have been devised for causing the rapid movement of the entire razor, a shaving head holding a disposable cartridge, or only a razor blade mounted on or within the razor. Typically, the blade or cartridge is disposed on a support to which movement is imparted.

Early versions of vibrating razors tended to be cumbersome and required external drive sources to impart movement to the blades or blade supports.

One well-known arrangement, herein referred to as the "eccentric weight" type razor, incorporates a weight which is eccentrically mounted on a rotating shaft such as the shaft of an electric motor. The rapid rotation of the eccentrically mounted weight provides a generally elliptical movement to the entire razor. In this type of razor, the entire razor, including the handle, moves in an elliptical path. It is actually the inability of the person holding the razor to hold the razor still which results in movement of the blade during shaving.

Other types of vibrating razors impart a movement to a disposable cartridge or blade in a direction which is not parallel to the plane of the surface being shaved. An example of this type of *vibrating razor* is disclosed in U.S. Pat. No. 4,642,892 to Ishida. The Ishida

razor drives the cartridge obliquely relative to the blade edge.

Many of the vibrating razors known in the art, including the "eccentric weight" type razors, do not impart movement directly to the blade or cartridge support. In such razors, the blade or cartridge is not positively or directly driven by the electric motor. Another example of a *vibrating razor* which does not directly impart movement to the cartridge support is shown in U.S. Pat. No. 4,819,330 to Fenn, et al. The Fenn razor comprises a hollow shaver head resiliently mounted on a handle. The hollow shaver head has a pivotally mounted weight disposed therein which is driven by an electric motor. When the motor is energized and the weight is caused to oscillate within the hollow shaver head, the shaver head rocks relative to the handle due to the inertia imparted by the oscillating weight. The shaver head of the Fenn patent is not directly driven by the electric motor and, therefore, could remain still relative to the handle while the electric motor continues to drive the pivotally mounted weight.

It would, therefore, be desirable to provide a self-contained vibrating razor wherein a piezoelectric actuator directly imparts movement to a blade.

#### **Summary of Invention:**

An electric razor comprising of a piezoelectric, electrostrictive, ceramic or ferroelectric film substrate. A battery for powering said piezoelectric, electrostrictive, ceramic or ferroelectric film type substrate. A handle which encases an electronic control module and battery wherein said handle has a longitudinal axis. An electric razor head comprising of a piezoelectric, electrostrictive, ceramic or ferroelectric film substrate. A battery for powering said piezoelectric, electrostrictive, ceramic, or ferroelectric film type substrate, an electronic control module all of which are collocated on the razor head itself. Both these configurations provide a means for vibrating the cutting blades without the use of moving parts.

The present invention is directed to a razor and, more particularly, to a razor head which will vibrate the cutting blades without the use of moving parts. Present vibrating razors

known in the art tend to be cumbersome and require external drive sources to impart movement to the cutting blades. The methods used to vibrate the cutting blades use moving parts. These moving parts take many forms, such as; motors, eccentric weights, rotating shafts, gears, etc.... Moving parts cause vibrations to be translated throughout the razor assembly. These vibrations make the shaving difficult and annoying. The vibrations imparted to the users hand and arm does not aid in the hair removal process. It would therefore be desirable to provide a self-contained vibrating razor head wherein the cutting blades were vibrated without the aid of moving parts. Minimal vibrations will be felt by the user's hands due to vibrating the cutting blades only. The present invention is directed to a vibrating razor which provides movement to the cutting blades only. In accordance with the present invention, a piezoelectric, electrostrictive, ceramic or ferroelectric material is applied to the cutting blades. The cutting blades are vibrated electrically. An electronic control module will generate the driving signal. The electronic control module and/or battery can be positioned on the handle and/or razor head itself. The driving signal can be adjusted to suit the user's needs. The control assembly and power supply are housed within the handle of the razor. Alternatively, the control module and battery can exist on the razor head alone. This arrangement will not require an electrical connection between the handle and razor head.

#### Brief Description of Drawings

The features of the invention believed to be novel are set forth in the appended claims. The invention, however, together with further objects and advantages thereof, may best be understood by reference to the following description taken in conjunction with the accompanying drawing(s) summarized below.

Figure 1 is a photograph which illustrates a razor head with a mechanically-responsive material attached to the cutting blades.